

WHAT IS CLAIMED IS:

1. An optical network unit coupled to an optical access network system, which receives a data stream and dechurns information contained in the received data stream by using a churning key, comprising:

(a) churning parameter memory means for storing churning parameters that indicate which logical connections are churned or not churned, comprising:

10 (a1) first memory means, initially assigned an active role, for storing the churning parameters that are currently used, and

(a2) second memory means, initially assigned a backup role, for storing newly updated churning parameters,

15 wherein said first memory means and second memory means are controlled so that the active and backup roles will alternate with each other at every churning key updating time point at which an updated churning key becomes effective; and

20 (b) data dechurning means for receiving a data stream consisting of a plurality of frames and dechurning churned information contained in the data stream according to the churning parameters stored in said first or second memory means currently playing the active role, the churning parameters being activated at the beginning of a frame subsequent to the churning key updating time point.

2. The optical network unit according to claim 1, wherein:

said first memory means is assigned the backup
5 role, and said second memory means is assigned the active
role as a result of said alternating of the active and
backup roles at the churning key updating time point; and

said churning parameter memory means performs a
copying process to copy the stored churning parameters
10 from said second memory means to said first memory means.

3. The optical network unit according to
claim 2, wherein said churning parameter memory means
saves a new churning parameter into said first memory
15 means after the copying process is finished, when the new
churning parameter is received during the copying process.

4. The optical network unit according to
claim 1, wherein said churning parameter memory means
20 comprises said first and second memory means each having
two ports for reading out data therefrom.

5. The optical network unit according to
claim 1, wherein said churning parameter memory means,
25 after receiving each newly updated churning parameter,
verifies whether the received churning parameter has
correctly been written to said first or second memory

means, and returns an acknowledge message only when the received churning parameter is successfully verified.

6. The optical network unit according to
5 claim 1, further comprising:

a non-volatile memory; and

external memory control means for storing the churning parameters into said non-volatile memory.

10 7. The optical network unit according to claim 6, wherein said external memory control means compares each received churning parameter with the corresponding churning parameter read out of said second memory means currently playing the backup role, so as to
15 write only changed churning parameters to said non-volatile memory.

8. The optical network unit according to claim 6, wherein:

20 said external memory control means comprises a local memory to store the churning parameters temporarily; and

upon power-down, said external memory control means transfers at a time the churning parameters from
25 said local memory to said non-volatile memory.

9. The optical network unit according to

claim 6, wherein:

said external memory control means comprises a local memory to store the churning parameters temporarily; and

5 upon power-down, said external memory control means transfers only changed churning parameters from said local memory to said non-volatile memory.

10 10. The optical network unit according to claim 6, wherein said churning parameter memory means receives the churning parameters from said non-volatile memory only when the optical network unit is in a standby state after power-up.

15 11. The optical network unit according to claim 6, wherein said churning parameter memory means activates either of the churning parameters received from said non-volatile memory and a set of newly supplied churning parameters after power-up.

20 12. The optical network unit according to claim 1, further comprising dechurning mask means for disabling the dechurning function of said data dechurning means during a period from a restarting time point to the
25 churning key updating time point, said restarting time point being a time point when the optical network unit re-enters an operating state from another state after having

left the operating state.

13. An optical network unit coupled to an optical access network system, which receives a data stream and dechurns information contained in the received data stream by using a churning key, comprising:

churning parameter memory means for storing churning parameters that indicate which logical connections are churned or not churned; and

10 data dechurning means for receiving the data stream consisting of a plurality of frames and dechurning the information contained in the data stream according to the churning parameters stored in said churning parameter memory means, the churning parameters being activated at
15 the beginning of each frame, whereby an update having been made thereto in a specific frame becomes effective in the next frame.

14. An optical line terminal coupled to an optical access network system, which transmits a data stream containing information that is churned by using a churning key, comprising:

flag control means for controlling flags when sending the data stream to a receiving end; and

25 churning parameter transmission control means for controlling transmission of churning parameters to the receiving end, based on the status of the flags, the

churning parameters indicating which logical connections are churned or not churned.

15. The optical line terminal according to
5 claim 14, wherein said flag control means clears an initial parameter delivered flag when the receiving end is in a standby state, and sets the initial parameter delivered flag at the end of an initial parameter delivery process that delivers an entire set of the current
10 churning parameters to the receiving end.

16. The optical line terminal according to
claim 14, wherein the flags provided by said flag
controlling means include an initial parameter delivery in
15 progress flag that indicates that an initial parameter delivery process is in progress to deliver an entire set of the current churning parameters to the receiving end.

17. The optical line terminal according to
20 claim 14, wherein said flag control means sets a parameter update failure flag when an update of the churning parameters being stored in the receiving end has failed.

18. The optical line terminal according to
25 claim 14, wherein said flag control means sets a parameter update unfinished flag when the receiving end has left an operating state.

19. The optical line terminal according to claim 14, wherein said flag control means sets a churning key updating flag when the optical line terminal is
5 updating the churning key.

20. The optical line terminal according to claim 14, wherein said flag control means sets a parameter update request flag when initiating an update of the
10 churning parameters.

21. The optical line terminal according to claim 20, wherein said flag control means sets the parameter update request flag to initiate an update of one
15 logical connection for one receiving end.

22. The optical line terminal according to claim 14, wherein said flag control means sets a parameter updating flag when the churning parameters are being
20 updated.

23. The optical line terminal according to claim 14, further comprising churning parameter overwriting means for performing a churning parameter
25 overwriting process that resends the churning parameters to the receiving end.

24. The optical line terminal according to claim 23, wherein said churning parameter overwriting means suspends the churning parameter overwriting process when transmitting another message having a higher priority.

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25. The optical line terminal according to claim 23, wherein said churning parameter overwriting means suspends the overwriting process while the churning parameters are being updated.

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26. The optical line terminal according to claim 23, wherein:

said churning parameter overwriting means comprises a timer that operates at predetermined intervals; and

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said churning parameter overwriting means is regularly activated by said timer.

27. The optical line terminal according to claim 26, wherein the interval of said timer is given by an external source.

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28. The optical line terminal according to claim 14, wherein:

said churning parameter transmission control means transmits a churning parameter message multiple times to send one of the churning parameters to the receiving end;

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when sending the first instance of the churning parameter message, said churning parameter transmission control means performs arbitration between the churning parameter message and other messages; and

5 after the arbitration is finished, said churning parameter transmission control means automatically transmits the multiple instances of the churning parameter message at predetermined intervals.

10 29. The optical line terminal according to claim 14, further comprising churning parameter updating means for updating the churning parameters at a churning key updating time point where the churning key is updated.